Chapter 4
Analysis, Interpretation and Results

4.1 Introduction

Analysis of data means studying the tabulated material in order to determine inherent facts in simple parts and putting the parts together in new arrangements for the purpose of interpretation. Interpretation of data is associated with the drawing of inference from the collected facts after an analytic study. It is the interpretation that makes it possible for us to utilize collected data in various fields of activity. The usefulness of the collected data lies in its proper interpretation. It provides certain conclusion about the problem under study. Keeping the objectives of the study in consideration, the data was collected and interpreted one by one. This chapter includes the analysis and interpretation of data collected for the study.

4.2 Objective wise Analysis and Interpretation of the data

There are two Objectives formulated for the study and the tool had questions related to these two objectives only. The data is analysed Objective wise, but separately for each item in the tool and it follows the interpretation of the data.

Objective 1 –
To know the tools/applications mostly used by the teachers for teaching mathematics online

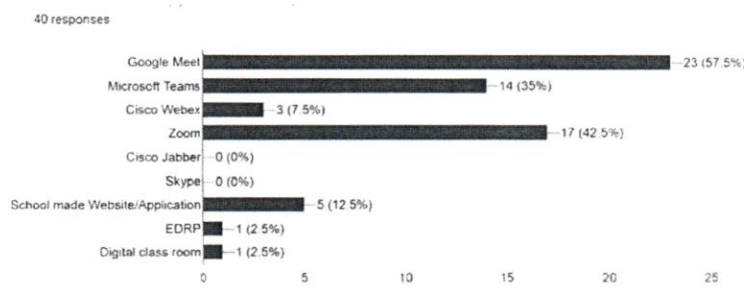
To achieve this objective, 11 questions were asked and Item wise analysis is given as following. As the teachers may be using more than one tool/application, so each percentage is from 100%.

- Tools/Applications used for online classes to teach Mathematics online (n=40)

Sr. No.	Online Platform	Percentage
1	Google Meet	57.5%
2	Zoom	42.5%
3	Microsoft Teams	35%
4	School made website/Application	12.5%
5	Cisco Webex	7.5%
6	EDRP	2.5%
7	Digital Classroom	2.5%
8	Cisco Jabber	0%
9	Skype	0%

From the table, it is observed that more than 50% teachers prefer Google Meet to conduct online classes for Mathematics. Zoom (42.5%) and Microsoft Teams (35%) are also used by many teachers widely. A few teachers are using School made Applications (12.5%), Cisco Webex (7.5%), EDRP (2.5%) and Digital Classroom (2.5%) to teach Mathematics Online.

Most of the teachers are using Google Meet, Zoom and MS Teams for teaching Mathematics.

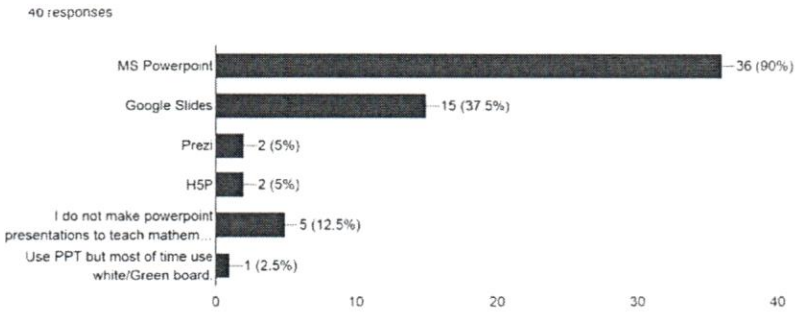


- Tools/Applications used for online classes to prepare powerpoint presentations (n=40)

Sr. No.	Online Platform	Percentage
1	MS Powerpoint	90%
2	Google Slides	37.5%
3	Prezi	5%
4	H5P	5%

From the table, it is observed that 90% teachers prefer MS Powerpoint to prepare powerpoint presentations to teach Mathematics online. Google Slides (37.5%) is also used by many teachers may be because MS Office doesn't provide proper assistance on Android Smartphones, whereas Google Slides work on the Android Smartphones very easily. A few teachers are using Prezi (5%) and H5P (5%) to prepare powerpoint presentations. From the graph it can be observed that 12.5% teachers do not make powerpoint presentations to teach Mathematics and 2.5% teachers use White/Green board for the presentation.

Most of the teachers are using MS Powerpoint and Google Slides to prepare the powerpoint presentations to deliver lesson for teaching Mathematics. MS Powerpoint works best on laptops and PCs and Google Slides works on Android SmartPhones and Tablets.

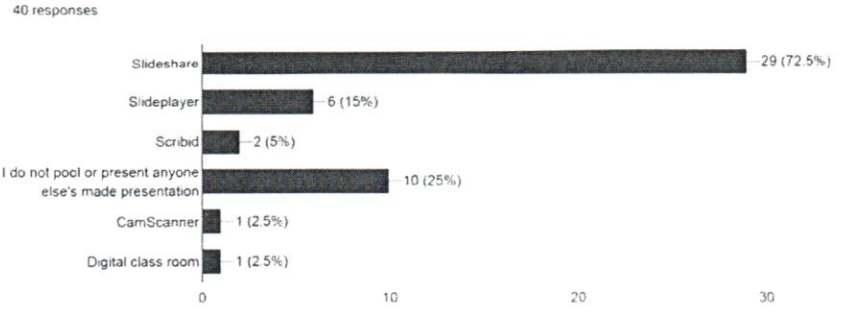


- Tools/Applications used to pool or present directly the powerpoint presentations (n=40)

Sr. No.	Online Platform	Percentage
1	Slideshare	72.5%
2	Slideplayer	15%
3	Scribid	5%
4	CamScanner	2.5%
5	Digital Classroom	2.5%

From the table, it is observed that mainly Slideshare (72.5%) is preferred by teachers to pool or present directly the powerpoint presentations to teach Mathematics online. Slideplayer (15%) and Scribid (5%)are also used by many teachers. A few teachers are using CamScanner (2.5%) and Digital Classroom (2.5%) to pool or present directly the powerpoint presentations. From the graph, it can be observed that 25% teachers do not pool or present directly the powerpoint presentations.

Most of the teachers are using Slideshare to pool or present directly the powerpoint presentations to deliver lesson for teaching Mathematics. As 80 million professionals trust SlideShare to learn about any topic quickly from subject matter experts since 2006, it is a famous tool that is used by maximum teachers.

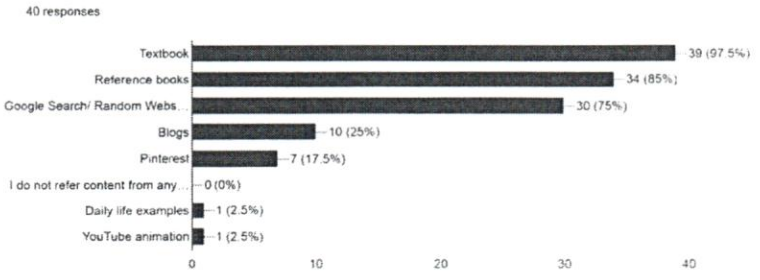


- Tools/Applications used for gathering Content to teach Mathematics (n=40)

Sr. No.	Online Platform	Percentage
1	Google Search/Random Websites	75%
2	Blogs	25%
3	Pinterest	17.5%
4	Youtube Animation	2.5%

From the table, it is observed that 75% teachers prefer Google Search and Random Websites for gathering the content in online mode to Teach Mathematics. Blogs (25%) and Pinterest (17.5%) are also used by many teachers.2.5% teachers use Youtube animation as the content to teach. From the graph it can be observed that Textbook (97.5%) and Reference books (85%) are the 2 most commonly used offline tools that are used by the Mathematics teachers apart from the online tools. Also, 2.5% teachers use Daily life examples as their content.

Most of the teachers are using Google Search through which they gather content from Random Websites to teach Mathematics. Blogs and Pinterest are also used by the teachers. But the teachers still rely on the textbooks and reference books (offline) for gathering the content to teach. E-textbooks and online reference books can also be used instead of offline mode.



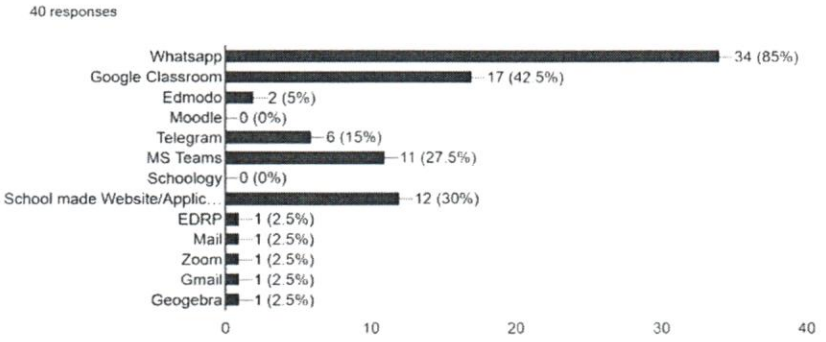
- Tools/Applications used for providing the content to the learners (n=40)

Sr. No.	Online Platform	Percentage
1	Whatsapp	85%
2	Google Classroom	42.5%
3	School made Website/ Application	30%
4	MS Teams	27.5%
5	Telegram	15%
6	Edmodo	5%
7	Email (Mail+Gmail)	5%
8	EDRP	2.5%
9	Zoom	2.5%
10	Geogebra	2.5%

From the table, it is observed that 85% teachers prefer Whatsapp to provide the content to the learners. Google Classroom (42.5%), School made Website/Application (30%) and MS Teams (27.5%)are also used by many teachers. A few teachers are also using Telegram (15%) which is similar to Whatsapp. Through Edmodo (5%) and Email (5%) also,

some teachers share the content with the learners. EDRP (2.5%), Zoom (2.5%) and Geogebra (2.5%) are used by some teachers. Moodle (0%) and Schoology (0%) are not used by any teacher.

Most of the teachers are using Whatsapp to provide the content to the learners. Google Classroom, School made Website/Application, MS Teams and Telegram are some other tools that are used by teachers. EDRP, Zoom and Geogebra are also used for providing the content by very less teachers. Geogebra gives a platform for the teachers to prepare their own videos/content and provide the code to the learners to learn from the Geogebra website.

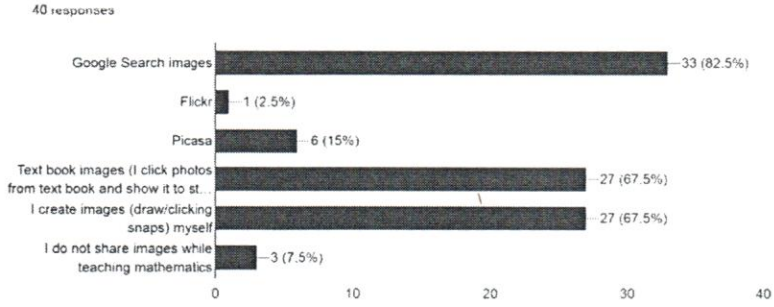


- Tools/Applications used for taking out the images to show some mathematics related concepts to the learners (n=40)

Sr. No.	Online Platform	Percentage
1	Google Search images	82.5%
2	Picasa	15%
3	Flickr	2.5%

From the table, it is observed that more than 80% teachers prefer Google Search images to take out the images to show mathematical concepts to the learners. Picasa (15%) and Flickr (2.5%) are also used by some teachers. From the graph it can be observed that a few teachers create images by drawing/clicking snaps (67.5%) and some click photos from the text book and show it to learners (67.5%).

Most of the teachers are using Google Search images to take out the images to show some mathematics related concepts to the learners. Whereas creating on their own and clicking the text book images is the second preferable way that the teachers are using.

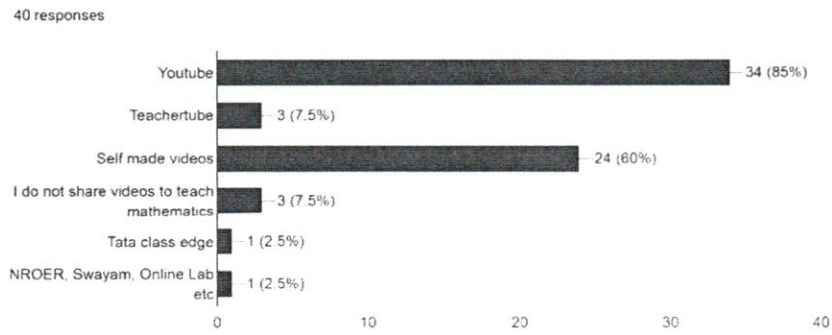


- Tools/Applications used for gathering the videos to show some demonstration to learners (n=40)

Sr. No.	Online Platform	Percentage
1	Youtube	85%
2	Teachertube	7.5%
3	Tata class edge	2.5%
4	NROER, Swayam, Online Lab, etc	2.5%

From the table, it is observed that 85% teachers prefer Youtube for gathering the videos to show some demonstration. Teachertube (7.5%), Tata class edge (2.5%) and NROER, Swayam, Online Lab, etc (2.5%) are also used by some teachers. 60% teachers demonstrate the concepts through self made videos (from graph).

Most of the teachers are using Youtube through which they gather videos to demonstrate Mathematical concepts. Teachertube is also used by some teachers. Very less teachers use Tata class edge, NROER, Swayam, Online labs, etc. Many teachers demonstrate through self made videos.

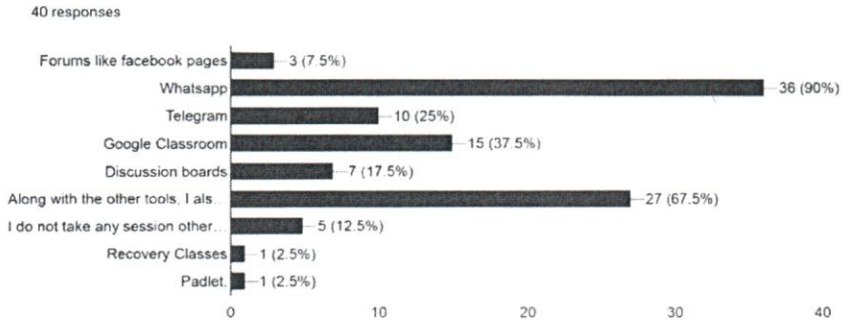


- Tools/Applications used for discussing doubts or problems after teaching mathematics (n=40)

Sr. No.	Online Platform	Percentage
1	Whatsapp	90%
2	Google Classroom	37.5%
3	Telegram	25%
4	Discussion boards	17.5%
5	Forums like Facebook pages	7.5%
6	Padlet	2.5%
7	Recovery Classes	2.5%

From the table, it is observed that 90% teachers prefer Whatsapp for discussing the doubts or problems after teaching Mathematics. Google Classroom (37.5%), Telegram (25%), Discussion boards (17.5%) and Forums like Facebook pages (7.5%) are also used by many teachers. 2.5% teachers use Padlet for Doubt sessions. 2.5% teachers conduct recovery classes for the doubt or problem sessions. From the graph, it can be observed that 67.5% teachers take doubts/problems during the online class, along with other tools.

Most of the teachers are using Whatsapp for the discussion of doubts or problems of the learners. Google Classroom and Telegram are also used by a few. Many teachers take the doubts during the online classes.

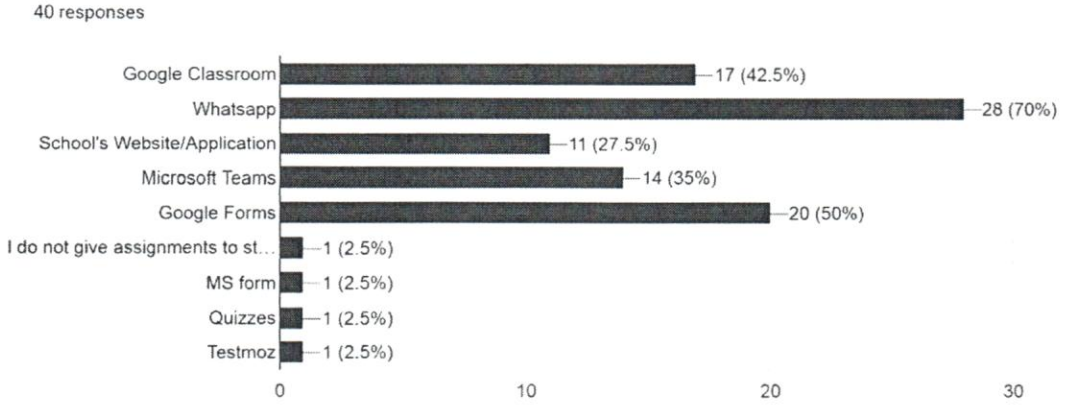


- Tools/Applications used to collect and analyze learners' assignments (n=40)

Sr. No.	Online Platform	Percentage
1	Whatsapp	70%
2	Google Forms	50%
3	Google Classroom	42.5%
4	Microsoft Teams	35%
5	School's Website/Application	27.5%
6	MS form	2.5%
7	Quizzes	2.5%
8	Testmoz	2.5%

From the table, it is observed that 70% teachers prefer Whatsapp for collecting and analyzing the assignments. Google Forms (50%) and Google Classroom (42.5%) are two Google made tools that are used by many teachers for collecting the assignments. Microsoft Teams (35%) and School's Website/Application (27.5%) are also used by some teachers. A few teachers use MS form (2.5%), Quizzes (2.5%) and Testmoz (2.5%) for collecting and analyzing the assignments.

Most of the teachers are using Whatsapp for the collecting and analyzing the assignments. Google form, Google Classroom, Microsoft Teams and School's Website/Applications are also used by many teachers. MS form, Quizzes and Testmoz are also some of the tools that a used by a few teachers.

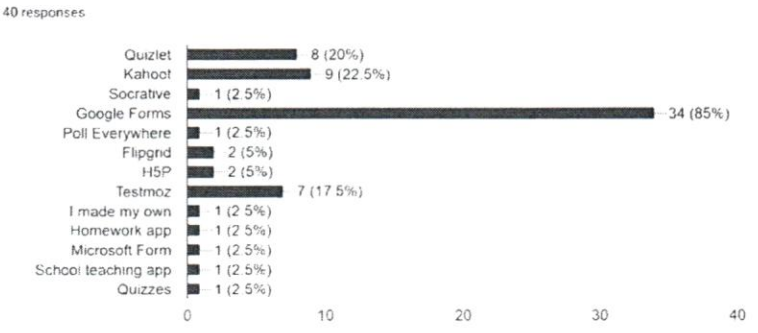


- Tools/Applications used to take Quizzes/tests (n=40)

Sr. No.	Online Platform	Percentage
1	Google Forms	85%
2	Kahoot	22.5%
3	Quizlet	20%
4	Testmoz	17.5%
5	Flipgrid	5%
6	H5P	5%
7	Socrative	2.5%
8	Poll Everywhere	2.5%
9	Homework app	2.5%
10	Microsoft Form	2.5%
11	Quizzes	2.5%
12	School teaching app	2.5%

From the table, it is observed that 85% teachers prefer Google Forms for taking Quizzes/tests of Mathematics. Kahoot (22.5%), Quizlet (20%) and Testmoz (17.5%) are used by the teachers. Flipgrid (5%) and H5P (5%) are also used by some teachers. A few teachers use Socrative (2.5%), Poll Everywhere (2.5%), Homework app (2.5%), MS form (2.5%), Quizzes (2.5%) and Testmoz (2.5%) for taking Quizzes/tests of the learners.

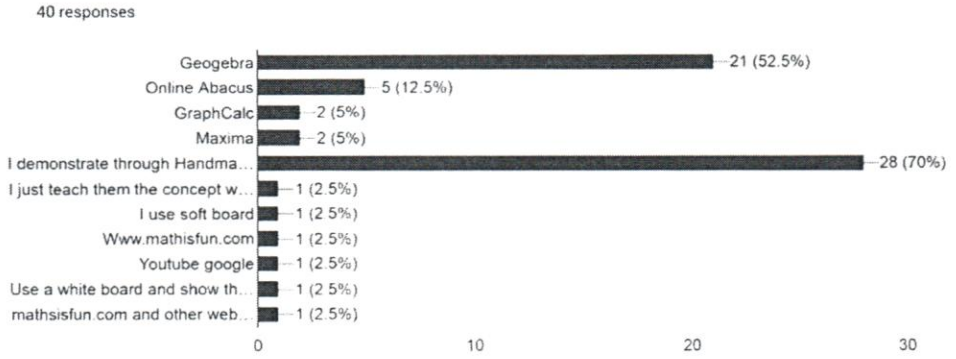
Most of the teachers are using Google Forms for taking Quizzes/tests of Mathematics. Kahoot, Quizlet and Testmoz is also used by many teachers.



- Tools/Applications used to demonstrate activities/concepts like Graphs, Geometry, etc. while teaching mathematics online (n=40)

Sr. No.	Online Platform	Percentage
1	Geogebra	52.5%
2	Online Abacus	12.5%
3	GraphCalc	5%
4	Maxima	5%
5	Mathisfun.com and other websites	5%
6	Youtube/Google search	2.5%

From the table, it is observed that more than 50% teachers prefer Geogebra to demonstrate activities/concepts while teaching mathematics online. Online Abacus (12.5%), GraphCalc (5%), Maxima (5%) and websites like mathisfun.com (5%) are used by some teachers. A few teachers also use Youtube/Google Search (2.5%) to demonstrate some concept. About 70% teachers demonstrate through the Handmade TLM through the live video while taking the online class.
Geogebra is the only online tool that is used by most of the teachers. Also, most of the teachers prefer to demonstrate the handmade TLMs while teaching online.



Objective 2 –
To analyse the user friendliness of the different e-learning tools/applications in teaching mathematics online

To achieve this objective, 11 questions were asked and Item wise analysis is given as following. To calculate the user-friendliness of E-learning tools/applications, four categories were used, which were -

1. Never Used
2. Difficult
3. Moderate
4. Easy

- User Friendliness of the Tools/Applications used for online classes to teach Mathematics online (n=40)

Sr. No.	Online Platform	Never Used	Difficult	Moderate	Easy
1	Google Meet	17.5%	7.5%	22.5%	52.5%
2	Zoom	12.5%	7.5%	15%	65%
3	Microsoft Teams	37.5%	10%	22.5%	30%
4	School made website/Application	62.5%	10%	7.5%	20%
5	Cisco Webex	67.5%	12.5%	7.5%	12.5%

From the table, it is observed that Zoom (65%) and Google Meet (52.5%) are easy to use in comparison with the other applications. Microsoft Teams (30%) is also easy for a few teachers.

- User Friendliness of the Tools/Applications used to prepare powerpoint presentations (n=40)

Sr. No.	Online Platform	Never Used	Difficult	Moderate	Easy
1	MS Powerpoint	0%	2.5%	15%	82.5%
2	Google Slides	45%	0%	17.5%	37.5%
3	Prezi	85%	7.5%	7.5%	0%
4	H5P	82.5%	7.5%	7.5%	2.5%

From the table, it is observed that MS Powerpoint (82.5%) is the most user-friendly for maximum teachers and almost everyone has used it. Google Slides (37.5%) is also easy for a few but 45% teachers have not used it. Prezi and H5P are not used by above 80% teachers.

- User Friendliness of the Tools/Applications used to pool or present directly the powerpoint presentations (n=40)

Sr. No.	Online Platform	Never Used	Difficult	Moderate	Easy
1	Slideshare	22.5%	0%	27.5%	50%
2	Slideplayer	60%	5%	22.5%	12.5%
3	Scribid	80%	5%	12.5%	2.5%

From the table, it is observed that Slideshare (50%) is easier to use for most of the teachers than Slideplayer (12.5%), whereas Scribid is not used by 80% teachers.

- User Friendliness of the Tools/Applications used for gathering Content to teach Mathematics (n=40)

- User Friendliness of the Tools/Applications used for gathering the videos to show some demonstration to learners (n=40)

Sr. No.	Online Platform	Never Used	Difficult	Moderate	Easy
1	Youtube	5%	0%	10%	85%
2	Teachertube	77.5%	7.5%	10%	5%

From the table, it is observed that most of the teachers find Youtube (85%) as the easiest application to gather videos to show demonstration. Teachertube (77.5%) is not known by most of the teachers as they have never used it.

- User Friendliness of the Tools/Applications used for discussing doubts or problems after teaching mathematics (n=40)

Sr. No.	Online Platform	Never Used	Difficult	Moderate	Easy
1	Whatsapp	5%	2.5%	7.5%	85%
2	Google Classroom	47.5%	0%	12.5%	40%
3	Telegram	62.5%	0%	7.5%	30%
4	Discussion boards	67.5%	0%	10%	22.5%
5	Forums like Facebook pages	77.5%	2.5%	5%	15%

From the table, it is observed that Whatsapp (85%) seems to be the easiest application for the discussion on doubts/problems after the online class. Also Google Classroom (40%) and Telegram (30%) are easy to use tools/applications.

- User Friendliness of the Tools/Applications used to collect and analyze learners' assignments (n=40)

Sr. No.	Online Platform	Never Used	Difficult	Moderate	Easy
1	Whatsapp	15%	7.5%	10%	67.5%
2	Google Forms	27.5%	2.5%	15%	55%
3	Google Classroom	45%	2.5%	10%	42.5%
4	Microsoft Teams	60%	2.5%	15%	22.5%
5	School's Website/Application	65%	0%	12.5%	22.5%

From the table, it is observed that Whatsapp (67.5%), Google Forms (55%) and Google Classroom (42.5%) are the easy to use applications and tools for collecting and analyzing the assignments. Microsoft Teams (22.5%) and School's Website/Application (22.5%) is also somewhat easy for the teachers who are using it.

is very easy to use by more than 80% of the teachers. The reason behind this might be the long term use of the application by almost every SmartPhone user.

- Geogebra is the most used Tool by the Mathematics teachers for the demonstration purpose. It is said to be easy to use by 37.5% teachers.

4.4 Conclusion

In this Chapter, the research scholar analysed the data that had been collected online, through Google form made Questionnaire for Mathematics Teachers. The analyzed data is interpreted and the research scholar reached to some results. In the following chapter, there are the Summary, major findings and some suggestions for the further study.